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By DANIEL M. COHEN

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A REVIEW OF THE OPHIDIOID FISH GENUS OLIGOPUS WITH THE DESCRIPTION OF A NEW SPECIES FROM WEST AFRICA

By Daniel M. Cohen [1]

Introduction

This paper defines the genus *Oligopus*, presents a discussion of generic synonymy, and gives diagnoses of six species, one of which is described herein as new to science.

The species of *Oligopus* have numerous fin rays and small scales, as is true of many other ophidioids. Because the bases of the fin rays almost invariably are obscured by darkly pigmented skin, most counts of vertical fin elements were made from X-ray photographs. In addition, internal skeletal characters were observed only from X-ray photographs. Examination of the head pores was aided by the use of a compressed air jet.

These fishes secrete a thick mucous coat that often makes it difficult to count scales and to observe pores. Also, the papillae that mark

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the course of the lateral line are fragile structures which may be lost when the mucous coat is removed.

Following are the definitions of some of the terms and abbreviations used in this paper: Predorsal: shortest distance between tip of snout and a vertical through origin of dorsal fin; preanal: shortest distance between tip of snout and a vertical through origin of anal fin; SL: standard length; HL: head length; upper jaw: shortest distance between tip of snout and posterior margin of maxillary; greatest depth of maxillary: depth at posterior expanded region of bone, but not including downward projecting maxillary spine; greatest head width: width of head with opercular flap compressed; D: dorsal fin rays; A: anal fin rays; caudal fin rays: only those rays articulating with hypural plate; vertebrae: count not including hypural; lateral scale rows: counted from upper angle of opercle; head canals: terminology follows Robins (1959).

I have examined material deposited in the following institutions, and I am much indebted to their respective curators: Academy of Natural Sciences of Philadelphia (ANSP); British Museum (Natural History) (BMNH); Museum of Comparative Zoology at Harvard University (MCZ); Rhodes University, Grahamstown, South Africa (RU); Scripps Institution of Oceanography (SIO); Stanford University, Division of Systematic Biology (SU); University of Bergen Zoological Museum (UBZM); University of Copenhagen Zoological Museum (UCZM); University of Hawaii (UH); U.S. National Museum (USNM); University of Puerto Rico (UP). Mr. Luis Rivas has furnished me with information concerning the type of *O. claudei*. Mr. and Mrs. Craig Phillips have donated a specimen of *Stygnobrotula*. Dr. Frank H. Talbot and Mr. W. I. Follett X-rayed the type of *Eutyx diagrammus*. Mr. Jørgen Nielsen X-rayed the type of *Bythites fuscus*. Mr. Alwyne Wheeler X-rayed specimens in the British Museum. I particularly thank my colleagues Dr. Bruce B. Collette and Dr. Ernest A. Lachner for their advice during the course of this study and for their critical review of the manuscript.

Genus *Oligopus* Risso

Oligopus Risso, 1810, p. 142 (type species by monotypy *Oligopus ater* Risso, 1810).

Gadopsis (not Agassiz, 1845; not Richardson, 1848) Filippi, 1856, p. 170 (type species by monotypy *Oligopus ater* Risso, 1810).

Grammonus Gill *in* Goode and Bean, 1896, p. 315 (type species by monotypy *Oligopus ater* Risso, 1810).

Verater Jordan, 1919a, p. 343 (proposed as a replacement name for *Pteridium* Filippi and Verany, 1859; however, these authors used *Pteridium* Scopoli, 1777. Type species by original designation of Jordan *Oligopus ater* Risso).

Eutyx Heller and Snodgrass, 1903, p. 224 (type species by monotypy *Eutyx diagrammus* Heller and Snodgrass, 1903).

Bathystorreus Howell Rivero, 1934, p. 69 (type species by original designation *Benthocometes claudei* Torre, 1930).

Diagnosis.—Gill membranes separate. Chin barbel absent. Live-bearing. Pelvic fins each with one ray, originating close to level of posterior margin of preopercle and about an eye diameter behind symphysis of cleithra; vertical fins continuous, covered proximally with thick, scaleless skin; pectoral fin entire, without separate, elongated rays. Head partly naked, bearing dermal papillae; anterior nostril tubular, located directly above upper lip; gill rakers 2 or 3; tongue a massive structure with anterior, prowlike projection fitting between 2 heads of geniohyoideus muscle. Branchiostegal rays 8. Body relatively short, stubby; head not depressed, height greater than width. Lateral line with 2 or more series, dorsal and ventral sometimes overlapping or parallel for entire lengths; palatine lacking teeth; ventrally directed projection usually present at posteroventral section of maxillary; posterior portion of maxillary expanded. Eyes well developed. Body completely covered with small cycloid scales. Lining of peritoneum pale in color.

First neural spine low; neural spines 2, 3, 4 raised, followed by series of low neural spines with more or less truncate tops (fig. 1). Vertebrae 1 and 2 without ribs; vertebra 3 with pair of anteroventrally directed ribs; vertebrae 4–6 with posteroventrally directed ribs articulating with centra; vertebra 7 with ribs attached, free or at end of parapophyses; vertebrae 8–10, 11 or 12 with ribs at ends of parapophyses; all other vertebrae lacking pleural ribs.

Relationships.—*Oligopus* is a distinctive group of well-differentiated species. The genus apparently represents a rather generalized type of ophidioid, at least among the live-bearers, and this fact, along with its relatively shallow-water habitat, suggests that, together with *Bythites*, *Oligopus* may be close to the stem from which various forms descended toward an abyssal habitat while others colonized the coral reefs: *Oligopus* has affinities with fishes that dwell in both areas.

Among the reef inhabitants, *Microbrotula*, *Grammonoides*, and *Stygnobrotula* are related to *Oligopus;* the former two even possess the peculiar projection on the maxillary. None of the three genera, however, displays the peculiar shortened and truncate neural spines (fig. 1) that are characteristic of *Oligopus;* moreover, *Microbrotula* has palatine teeth, and Böhlke (1957) has given a number of reasons for separating *Stygnobrotula* from *Eutyx* (here considered a junior synonym of *Oligopus*), most of which serve to separate *Stygnobrotula* from the more inclusive genus *Oligopus*. Particularly important are Böhlke's items 1, 2, 3, 4, 6, 7, 9, and 13 of his table 1, p. 3, to

which the reader is referred.[2] *Grammonoides* is also different in dentition, lacking the bands of granular teeth on the premaxillary and the dentary.

Among the genera confined to deeper water, the closest relatives of *Oligopus* are those forms with a tubular anterior nostril placed directly over the upper lip, reduced squamation on the head, and a single ray in each ventral fin. This group includes *Diplacanthopoma*, *Myxocephalus*, the species presently assigned to *Cataetyx* (at least two genera are included in this group), and *Bythites*. All of these differ from *Oligopus* in possessing palatine teeth, and in lacking shortened, truncate neural spines. In addition, *Diplacanthopoma* and *Myxocephalus* lack scales on the head. Most of the species of *Cataetyx* (though not the type, *C. messieri*) have strongly depressed heads.

Oligopus ater, the type species of *Oligopus*, long has been considered congeneric with a superficially similar species that was described originally by Doderlein (1886) as *Pteridium armatum*. Bougis and Ruivo (1954) reported on specimens that they identified as *Benthocometes robustus*, a name that they treated as a senior synonym of *P. armatum*. They illustrated (their fig. 19) specializations of the anterior vertebrae that bear some resemblance to those long known to exist in the Ophidiidae (in the restricted sense), but there is some conflict in this identification, for Doderlein (1886) did not show modified anterior vertebrae in his figure of a dissection of *Pteridium armatum*. These structures, however, have been shown to be sexually dimorphic in the ophidiid genus *Ophidion* (Rose, 1961). Whatever the identity of *P. armatum*, *Oligopus* differs widely both from Doderlein's description and from *Benthocometes*. It is of interest to note that another species of *Oligopus* (*O. claudei*) was also confused with *Benthocometes*.

The foregoing discussion is based on the material listed below.

Material examined.—*Benthocometes robustus* (USNM 29057, paratype); *Bythites fuscus* (UCZM, holotype); *Bythites lepidogenys* (USNM 74152, holotype); *Cataetyx hawaiiensis* (USNM 162715, holotype); *Cataetyx laticeps* (UBZM, holotype); *Cataetyx messieri* (BMNH, holotype); *Diplacanthopoma brachysoma* (BMNH, holotype); *Diplacanthopoma brunnea* (USNM 74148, holotype); *Grammonoides opisthodon* (RU, holotype); *Microbrotula rubra* (USNM 162710, holotype); *Myxocephalus japonicus* (USNM 160604); *Stygnobrotula latebricola* (USNM 187777); *Xenobythites armiger* (USNM 74153, holotype).

Synonymy.—In his original description of *Oligopus ater*, Risso (1810) credited the genus *Oligopus* to Lacépède; however, Risso's

[2] Boeseman (1960) overlooked the description of *Stygnobrotula latebricola* and described the same species as *Eutyx tumidirostris*.

spelling is an unjustified emendation of *Oligopodus* Lacépède, 1800, proposed for *Coryphaena velifera* Pallas, and therefore, *Oligopus* is available from 1810 with Risso as the author.

Swainson (1839) placed *O. ater* in *Pteridium* Scopoli, and Filippi (1856) proposed the generic name *Gadopsis* (already twice preoccupied) for the species. Filippi and Verany (1859) then accepted *Pteridium* Scopoli (proposed for *Coryphaena velifera* Pallas) for *O. ater* and have been followed by numerous authors. Gill (*in* Goode and Bean, 1896) proposed *Grammonus* for *Oligopus ater* Risso, with no comment.

Verater was first proposed by Jordan (1919a) as a substitute for *Pteridium* Filippi and Verany although these authors plainly indicated they were following Swainson, who used *Pteridium* Scopoli; however, in a later publication during the same year, Jordan (1919b) presented *Verater* as a replacement name for *Gadopsis* Filippi, with *O. ater* Risso as the type species.

Heller and Snodgrass compared *Eutyx* with *Grammonus* Gill and separated the two on the grounds that the former genus lacked an opercular spine, had a double lateral line, and had large muciferous canal openings on the head. Actually, *Eutyx* may have its small opercular spine hidden or exposed (Böhlke, 1957, and the present author); its lateral line (described below under *Oligopus diagrammus*) is similar to that in other species of the genus, and all of the species here referred to *Oligopus* have canal openings on the head.

Bathystorreus was proposed for a species originally described in *Benthocometes*, where it obviously did not belong. The single known specimen is in bad condition; however, an X-ray photograph showing the abdominal vertebrae gives reason enough to place this species in *Oligopus*.

Species.—Six species are referred herein to *Oligopus*. Although the available material of most is limited, a few suggestions concerning relationships and distributions can be presented. *O. claudei* from the tropical western Atlantic is distinct from all other *Oligopus*. Distinct preopercular spines and numerous head pores are its distinguishing characters. *O. diagrammus* is known from Galapagos, Guadalupe, and lower Baja California. The material suggests the presence of a species complex or a group of subspecies. *O. diagrammus* has a reduced number of head pores but high fin ray and vertebral counts. Apparently it is most distantly related phylogenetically to the western Atlantic species. The other species are *O. longhursti* (herein described as new), known from tropical West Africa; *O. ater* from the Mediterranean; *O. robustus* from Japan, the Philippines, and the Indian Ocean; and *O. waikiki* from Hawaii. The latter, wide-ranging group of four species is intermediate phylogenetically as

well as geographically between the western Atlantic and the eastern Pacific species.

I do not consider *Grammonus leucos* Osorio, 1917, to be referable to *Oligopus*, as the original description mentions the presence of teeth on the palatines. Professor Fernando Frade has informed me that the type cannot be found in the Museu Bocage.

Key to Species of *Oligopus*

1a. One or no pores in lateral head canal system; 1 or 2 pores in supraorbital canal. Spines along preopercle margin absent or small and weak.
  2a. Dorsal fin rays 68–87; anal fin rays 51–62; vertebrae 40–46.
    3a. Dorsal fin rays 68–74; anal fin rays 51–52; vertebrae 40–42 . . . **O. ater**
    3b. Dorsal fin rays 83–87; anal fin rays 57–62; vertebrae 44–46.
      4a. Lateral scale rows about 120. Upper row of lateral line organs about 35–45; lower about 35–40; dip in ventral lateral line in vent area . . . . . **O. longhursti**
      4b. Lateral scale rows about 75–85. Upper row of lateral line organs about 21; lower row about 25–30; no dip in ventral lateral line. **O. robustus**
  2b. Dorsal fin rays 93–115; anal fin rays 71–91; vertebrae 48–53.
    5a. Lateral scale rows about 80; anal fin rays 71; 6 pores in infraorbital canal system . . . . . **O. waikiki**
    5b. Lateral scale rows 97–115; anal fin rays 76–91; 5 or fewer pores in infraorbital canal system . . . . . **O. diagrammus**
1b. Three or 4 pores in lateral head canal system; 2, 3, or 4 pores in supraorbital canal. Several small but distinct spines along preopercle margin. **O. claudei**

Oligopus ater Risso

PLATE 2

Oligopus ater Risso, 1810, p. 142, pl. 11, fig. 41 (original description, Gulf of Saint Hospice, France).—Fowler, 1936, p. 1329 (description, synonymy).

Oligopus niger Risso, 1826, p. 338 (new name for *O. ater* Risso, 1810; description).

Pteridium ater Swainson, 1839, p. 302 (*O. ater* Risso listed under *Pteridium* Scopoli).

Gadopsis ater Filippi, 1856, p. 170 (description of swim bladder, new genus proposed).

Pteridium atrum Filippi and Verany, 1859, p. 195, fig. 6 (synonymy, description, swim bladder, relationships).—Doderlein, 1886, p. 73 (comparison with *Pteridium armatum*).—Günther, 1887, p. 105 (description, 1 specimen from Mediterranean).—Bellotti, 1888, p. 222 (sexual dimorphism in dentition of specimens from Nice and nearby, comparison with *Pteridium armatum*.)—Lo Bianco, 1909, p. 741 (pelagic postlarvae circa 30 mm., January, February, March, in Gulf of Naples).—D'Ancona, 1938, p. 159, figs. 2, 4, 8 (comparison with *P. armatum*, description, based on material from Nice, Naples, and Zirona, nomenclature, relationships, distribution, additional references not here cited).

Grammonus ater Goode and Bean, 1896, p. 317 (new genus proposed, synonymy, compiled description).—Tortonese, 1958, p. 333 (listed, doubts that *G. ater* (Risso) and *G. armatus* (Doderlein) belong in different genera).

Verater ater Jordan, 1919a, p. 343 (new genus proposed).

Misidentifications: *Pteridium atrum* Emery, 1885, p. 158, fig. 21 (30 mm. specimen, description, probably *Benthocometes robustus*).—Roule and Angel, 1930, p. 110, pl. 6, fig. 146 (Azores, description of postlarvae).

STUDY MATERIALS.—1 specimen, Nice, MCZ 26457.

COUNTS AND MEASUREMENTS.—(Measurements given in mm., followed by percent of standard length in parentheses) D 74; A 52; pectoral 19; vertebrae 40; caudal 10; vertical scale rows about 83; SL 89; body depth at dorsal origin 17.5 (19.7); predorsal 31.2 (35.0); preanal 50.0 (56.1); HL 25.0 (28.0); snout 5.8 (6.5); orbit 3.0 (3.4); upper jaw 14.2 (15.9); greatest maxillary width 4.5 (5.1); greatest head width 11.0 (12.3). (See D'Ancona, 1938, p. 162, for additional data.)

DESCRIPTION.—Squamation: Scales present on large area on top of head behind eye level; present on side of head on opercle and in area ahead of opercle extending forward nearly to eye and ventrally to region behind maxillary. Dorsal and lateral scale patches separated by scaleless lateral canal.

Lateralis system: Lateral canal with single pore near upper angle of opercle. Supraorbital canal with 2 pores: 1 in front of, and below, anterior nostril; the other, difficult to find, above anterior nostril. Infraorbital canal with 6 pores: 3 beneath nostrils in skinfold over upper jaw; 1 very small pore close to level of posterior part of eye; 2 larger pores above posterior expanded part of maxillary. Preoperculomandibular canal with 8 pores: 2 at tip of dentary, 1 opening anteriorly, the other posteriorly; 1 beneath lower lip at about midlength of snout; 1 at about midlength of jaw; 1 slightly ahead of posterior margin of maxillary; 1 slightly behind same; 2 on posterior margin of preopercle.

Circumorbital and interorbital areas and side of snout cavernous, covered with thick skin bearing scattered papillae. Interorbital area particularly rugose.

Lateral line marked by small, dark, dermal filaments. Series of 23 originates above opercle. Between opercle and level of dorsal fin origin filaments in elongate, irregular cluster from which lateral line extending posteriorly in straight line, between midline and dorsal profile. Dorsal line terminating 63 mm. from tip of snout. Second line of about 40 filaments originating in midline close to level of posterior tip of pectoral fin, descending, then rising to midline of body to form shallow irregular semicircle with lowest point opposite vent, then extending straight back in midline of body to tail. Filaments similar to those along lateral lines scattered about on head.

Dentition: Premaxillary with band of uniform granular teeth. Dentaries with similar teeth and irregular row of larger, conical teeth along inner edge of granular band. Head of vomer a broad

V with arms expanded. Both short granular and larger conical teeth present on vomer. According to Bellotti (1888), females of this species have the type of dentition noted above, although without larger teeth on the vomer, while males have both larger teeth and granular teeth on the premaxillary, vomer, and dentary.

Head spines: Short, sharp-pointed spine piercing skin at upper corner of opercle. Posteroventral margin of preopercle with 2 blunt projections at angles. Ventrally directed spine at end of maxillary prominent, piercing skin.

Vertebrae and ribs: Neural spines 5–13 short and broad but becoming progressively more elongate and narrower, their tips truncate; neural spines on subsequent centra needle-like. Centra 7–11 with ribs at ends of parapophyses, subsequent centra lacking pleural ribs. Centra 4–8 with epipleurals attached to pleural ribs; on centra 9–12 epipleurals appear associated with parapophyses.

Color: Body light brown, vertical fins and head darker. Long in preservative, this specimen evidently was much darker in life. Risso used the common name "fanfre negre" and stated that the species was black.

Distribution.—Known from the area around Nice, from Naples, and from several localities in the Adriatic. Little is known of its depth distribution.

Habitat.—Dwells in rocky areas in caves, according to Risso (1810), and apparently is secretive.

Comments.—Professor D'Ancona (1938) has presented an excellent review of this species, and his paper should be consulted for information and references not given here.

Oligopus longhursti, new species

Plate 3

Study material.—All females. Holotype: USNM 187778, off Lagos, Nigeria in 5–10 fathoms, otter trawl, collected by A.R. Longhurst, August 1961. Paratypes: USNM 187779, 1 specimen, data as for holotype; USNM 191732, 2 specimens, Monrovia, Liberia, Bush Rod Island, beach seine, collected by George C. Miller, October 7, 1952; USNM 193678, 1 specimen, Liberia, 3–7 fathoms off mouth of St. Paul River, trawl, collected by George C. Miller, October 14, 1953.

Counts and measurements.—See table 1.

Description.—Squamation: Scales present on large area on top of head behind eye level; present on side of head over opercle and area in front of dorsal half of opercle, which extends to within eye diameter of eye. Lateral scale patch bounded dorsally by scaleless

lateral canal and ventrally by scaleless area that demarcates separate patch of scales posterior to rear margin of maxillary.

Lateralis system: Lateral canal with 1 pore near upper angle of opercle. Supraorbital canal with 2 pores: 1 in front of anterior nostril; the other, very small, above anterior nostril. Infraorbital canal with 5 or 6 pores: 3 in row behind anterior nostril; 1, very small, near level of posterior margin of eye (absent in USNM 193678); and 2 above posterior expanded portion of maxillary. Preoperculo-mandibular canal with 8 pores: 2 at tip of dentary, 1 opening anteriorly, the other posteriorly; 1 beneath lower lip close to level of posterior nostril; 1 slightly ahead of level of posterior margin of maxillary; 1 near lower angle of same; 2 shaped like elongate slits, on posterior margin of preopercle.

Circumorbital and interorbital areas and side of snout cavernous and covered with thick skin bearing many small, dark, dermal papillae similar to those marking course of lateral lines along side of body. These filaments particularly abundant in interorbital region.

One series of lateral line filaments numbering about 35–45 and originating on head above opercle and, after slight irregular dip near origin, extending posteriorly in straight line between midline of dorsal profile, this dorsal line terminating more than half way back along body. Second line of about 35–40 filaments originating at about midline close to level of posterior tip of pectoral fin, descending, then rising to midline of body to form irregular semicircle having lowest point opposite origin of anal fin, then extending in straight line in midline of body to tail.

Dentition: Premaxillary bearing uniform band of granular teeth. Dentaries bearing similar teeth plus irregular row of larger, conical teeth along inner edge of granular band. Head of vomer with widely spread wings bearing short granular teeth. All four specimens females.

Head spines: Short, weak spine present at upper corner of opercle. May be buried beneath skin and invisible without dissection, or barely visible at its tip. Posteroventral margin of preopercle may be completely rounded or show 2 slight angles. Maxillary spine varying from prominent projection pictured in holotype to virtually absent condition in 1 Liberian paratype.

Vertebrae and ribs: Neural spines 5–13 short and broad but becoming progressively more elongate and narrower, their tips more or less (5 and 13) truncate; neural spines on subsequent centra needle-like. Centra 7–12 with ribs at ends of parapophyses, subsequent centra lacking pleural ribs. Centra 4–9 with epipleurals attached to pleural ribs; on centra 10–13 epipleurals appearing to be associated with parapophyses.

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Color: Head and body brown, vertical fins black. Beneath superficial brown pigmentation of scales and scale pockets large, dark chromatophores distributed regularly on body.

Distribution.—Known only from the type localities. Taken in a beach seine and at 3–10 fathoms.

Comments.—The holotype extruded fertilized eggs that must have been close to hatching and that are about 0.9 mm. in diameter. The Nigerian paratype has paired ovaries about 25 mm. long. Each contains an estimated 3,000 unfertilized eggs (based on counts and volumetric displacement on ½ of 1 ovary), which are about 0.5 mm. in diameter. Eggs are of about the same size in all parts of the ovary; however, the eggs closest to the posterior end are more densely granular. One Liberian paratype (USNM 191732) extruded granular (unfertilized) eggs of about 0.5 mm. in diameter. The other Liberian specimen has its ovaries packed with an estimated several thousand young fish. The embryos are between 4 and 5 mm. long and have small yolk sacs and open choroid fissures. Elongate processes are attached to the embryo a short distance behind the yolk sac.

Oligopus robustus (Smith and Radcliffe)

Grammonus robustus Smith and Radcliffe *in* Radcliffe, 1913, p. 168, pl. 13, fig. 4 (original description, "*Albatross*" St. 5409, 10°38′ N., 124°13′ E.—Norman, 1939, p. 79 (Gulf of Aden, 457–549 m.).—Kamohara, 1954, p. 5, fig. 3 (5 specimens from Kochi market, description).

Bythites lepidogenys (not Smith and Radcliffe, 1913) Kamohara, 1952, p. 93 (3 specimens from Mimase, description).

Study material.—Holotype, USNM 74149, male.

Counts amd measurements.—(Measurements given in mm., followed by percent of standard length in parentheses) D 87; A 62; pectoral 25; vertebrae 46; caudal 8; vertical scale rows about 75; SL 129; body depth at D origin 32.5 (25.2); predorsal 42.2 (32.7); preanal 71.1 (55.1); HL 40.4 (31.3); snout 6.5 (5.0); orbit 6.5 (5.0); upper jaw 22.0 (17.1); greatest maxillary width 8.2 (6.4); greatest head width 21.2 (16.4). Additional meristic and morphometric data are presented by Kamohara (1954).

Description.—Squamation: Patch of scales present on nape. On sides of head, scales present on opercle and on area in front of opercle extending forward nearly to eye, dorsally to level of top of opercle, where scaleless lateral canal separates dorsal and lateral scale patches, and ventrally to area behind maxillary.

Lateralis system: Lateral canal with 1 pore near upper angle of opercle. Supraorbital canal with 2 pores: 1 below, and in front of, anterior nostril tube; the other immediately above tube. Infraorbital canal with 6 pores: 3 beneath nostrils over upper lip; 1 at

level of posterior part of eye; 2 above posterior expanded portion of maxillary. Preoperculomandibular canal with 8 pores: 2 at tip of dentary, 1 opening anteriorly, the other posteriorly; 1 beneath lower lip near level of posterior nostril; 1 close to midlength of jaw; 1 ahead of posterior margin of maxillary; 1 behind same; 2 at posteroventral angle of preopercle.

Small, dark papillae scattered on head, concentrated in interorbital area. Lateral line marked by papillae similar to those on head. One series of 21 originating above opercle and, after slight irregular dip near origin, extending posteriorly in straight line between midline and dorsal profile, terminating at level of vent. Second line of about 25 filaments originating in midline at level of origin of anal fin and extending posteriorly in midline of body to point about 10 mm. from tail (the tail has become somewhat abraded and in all likelihood the lateral line actually continues to the base of the tail as shown by Radcliffe, 1913, and Kamohara, 1954.)

Dentition: Premaxillaries, dentaries, and broadly V-shaped vomer bearing bands of uniformly small, granular teeth.

Sex: Specimen male with prominent, paired testes about 20 mm. long.

Head spines: Small, sharp-pointed spine piercing skin at upper angle of opercle. Posteroventral angles of preopercle with 2 very blunt points. Maxillary spine prominent on right side of specimen, weakly developed on left side.

Vertebrae and ribs: Neural spines 5–15 short and broad, but becoming progressively more elongate and narrower; their tips truncate; neural spines on subsequent centra more needle-like. Centra 7–11 with ribs at ends of parapophyses, subsequent centra lacking pleural ribs. Centra 4–7 with epipleurals attached to pleural ribs; on centra 8–15 epipleurals appearing to be associated with parapophyses.

Color (in alcohol, quoted from original description): "Wood-brown; dorsal and anal dusky anteriorly, becoming dark clove brown posteriorly; the basal portion of caudal clove brown, distal portion somewhat lighter; pectorals dusky; peritoneum silvery gray."

Distribution.—Known from Mimase, Japan; the Philippines between Cebu and Leyte, at a depth of 189 fathoms on a green mud bottom; and the Gulf of Aden between 25 and 30 fathoms.

Oligopus waikiki, new name

Plate 4

Microbrotula nigra Gosline, 1953, p. 220, fig. 1d (original description, off Waikiki Reef, Oahu, Hawaii).[3]

[3] If *Microbrotula nigra* Gosline is referred to *Oligopus*, the specific name must be rejected as a junior secondary homonym of *Oligopus niger* Risso, which is a junior synonym of *Oligopus ater* Risso.

Study material.—Holotype of *Microbrotula nigra*, USNM 179898, formerly UH 1684, female.

Counts and measurements.—(Measurements given in mm., followed by percent of standard length in parentheses) D 98; A 71; pectoral 26; vertebrae 48; caudal 8; vertical scale rows about 72; SL 61.4; body depth at D origin 17 (27.7); predorsal 16.8 (27.4); preanal 30.0 (48.9); HL 15.9 (25.9); snout 3.2 (5.2); orbit 3.0 (4.8); upper jaw 9.0 (14.7); greatest maxillary width 3.6 (5.9); greatest head width 9.5 (15.5).

Description.—Squamation: Patch of scales present on nape. Second patch covers opercle and dorsal half of area in front of it, extending forward to within eye diameter of eye. Small, separate patch consisting of few scales present behind rear margin of maxillary.

Lateralis system: Lateral canal lacking pores. Supraorbital canal with 2 pores: 1 below, and in front of, anterior nostril tube; the other, very small, above tube. Infraorbital canal with 6 pores: 3 beneath nostrils over upper lip; 1 at level of posterior part of eye; 2 above posterior expanded portion of maxillary. Preoperculomandibular canal with 8 pores: 2 at tip of dentary, 1 opening anteriorly, the other posteriorly; 1 beneath lower lip near level of posterior nostril; 1 close to midlength of jaw; 1 slightly ahead of level of posterior margin of maxillary; and 3 shaped like elongate slits along posteroventral and posterior margin of preopercle.

Small, dark papillae scattered on muzzle and interorbital region. Lateral line marked by papillae. One series of about 20 originating above opercle and, after dip near origin, extending posteriorly to level of vent. Second line of about 35 papillae originating in midline at level of origin of anal fin and extending posteriorly in midline of body to tail, although posterior papillae very small.

Dentition: Premaxillaries and dentaries bearing bands of uniformly small, granular teeth. Vomer with 2 patches of similar teeth. Although Gosline (1953) noted the presence of palatine teeth, I find no trace of them.

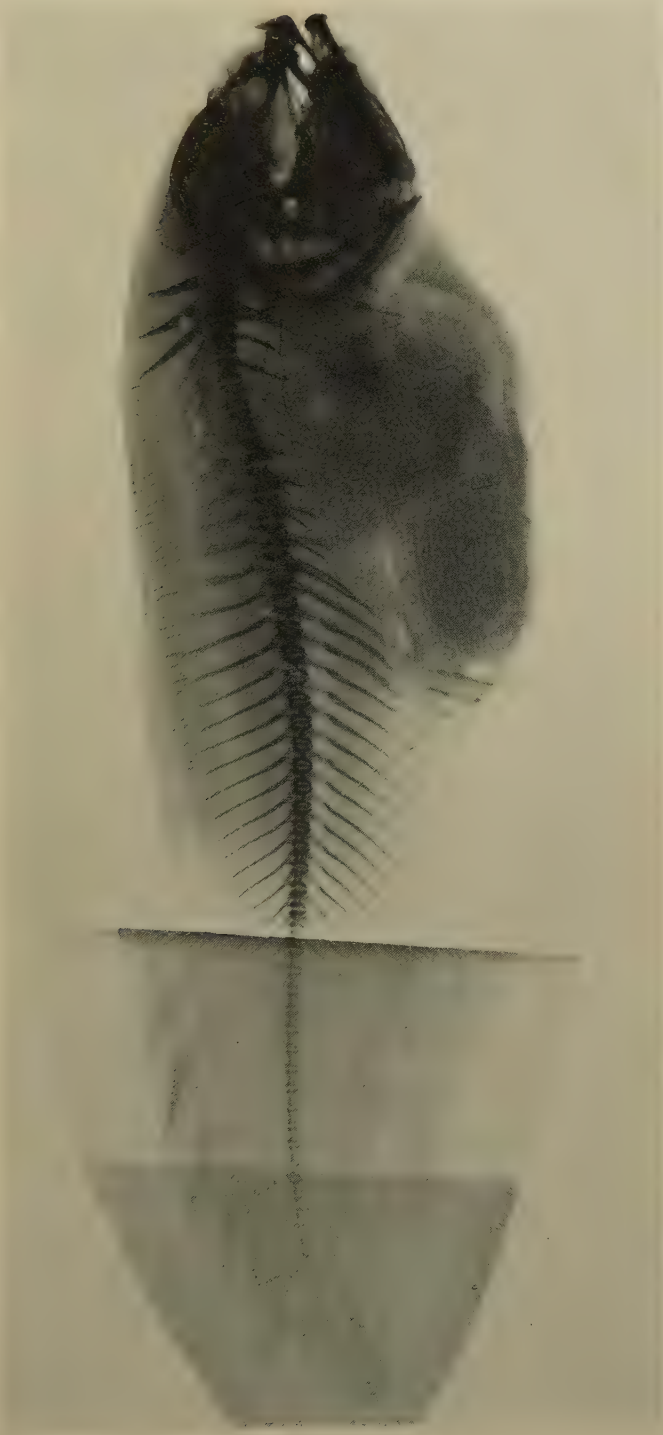
Sex: Specimen female with small embryos in ovaries.

Head spines: Small, sharp-pointed spine piercing skin at upper angle of opercle. Posteroventral angles of preopercle bearing several weakly spinous points. Maxillary spine prominently developed.

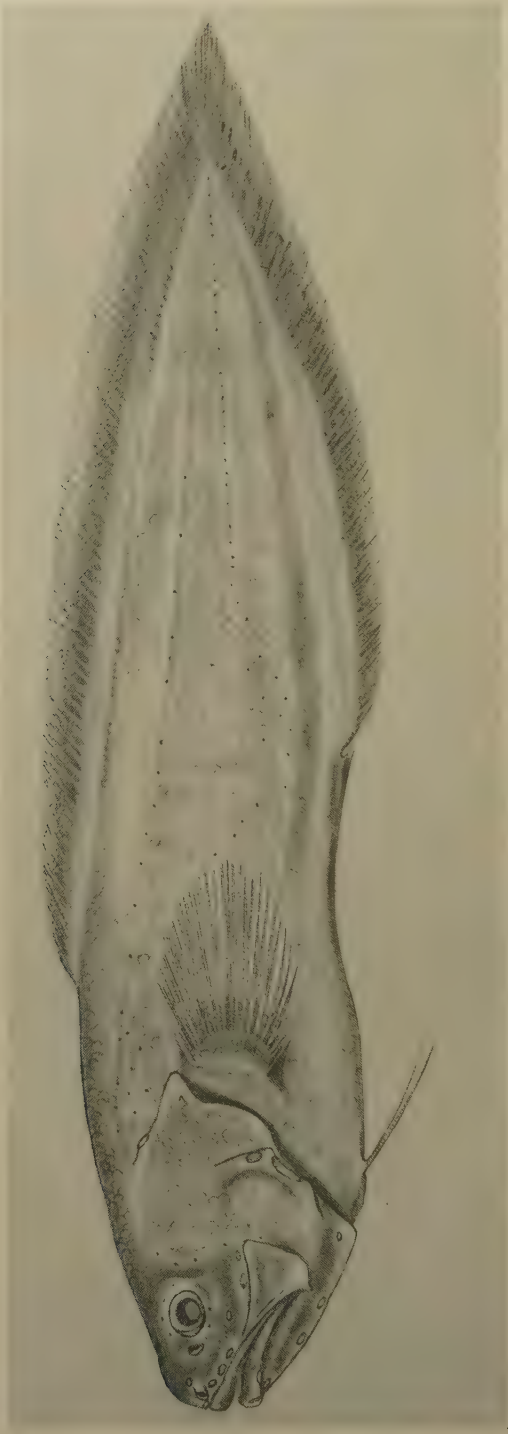
Vertebrae and ribs: Neural spines 5–14 short and broad, but becoming progressively more elongate and narrower, their tips truncate; neural spines on subsequent centra more needle-like. Centra 7–11 with ribs at ends of parapophyses, subsequent centra lacking pleural ribs. Centra 4–8 with epipleurals attached to pleural ribs; on centra 9–12 epipleurals appearing to be associated with parapophyses.

Color: Body brown, fins darker.

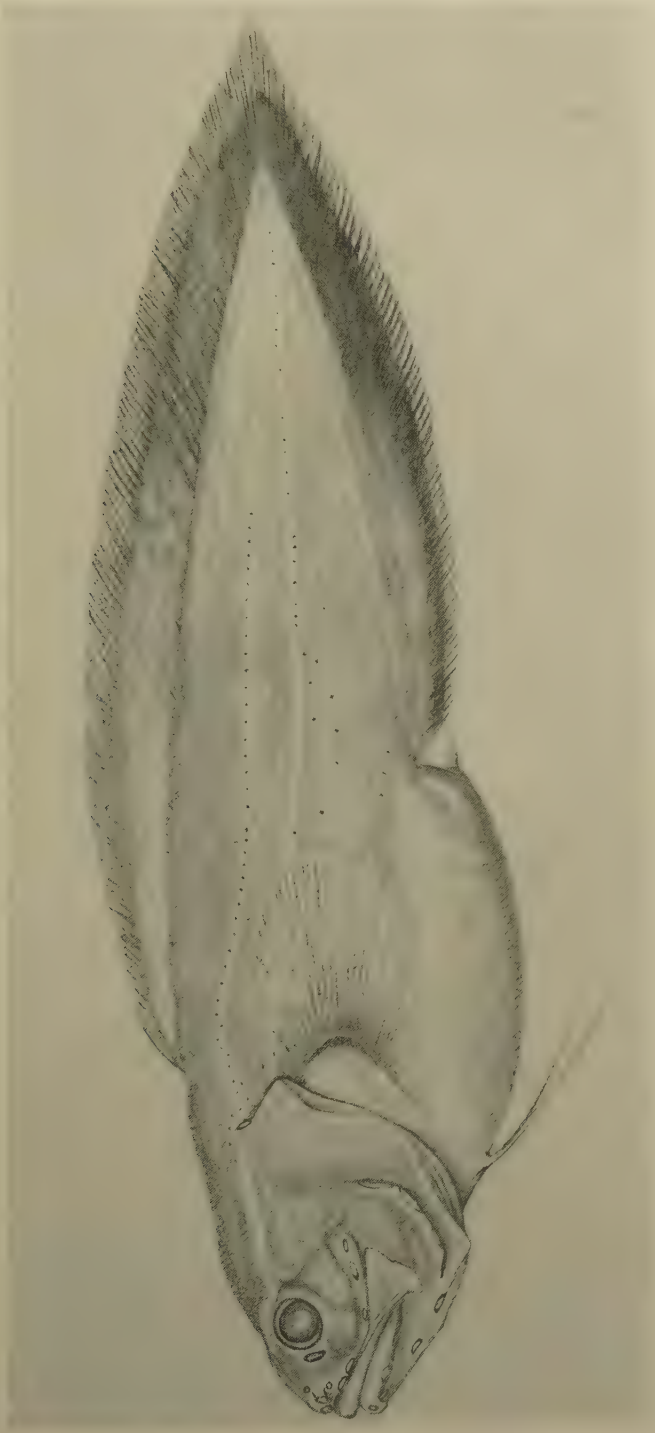
Distribution.—Known only from the type locality at about 30 feet.



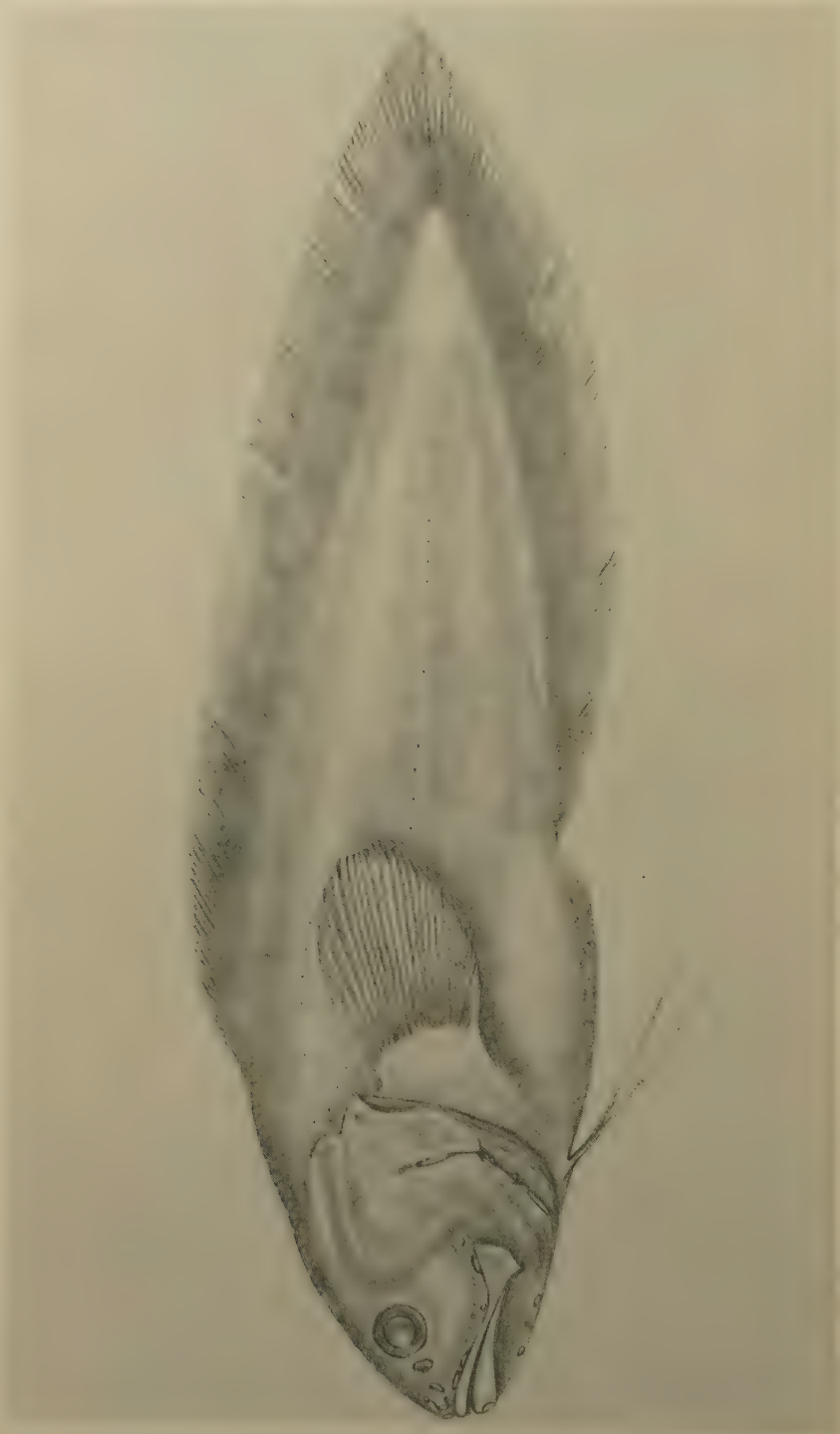
X-ray photograph of *Oligopus diagrammus* (SIO H53-169, 185 mm. SL. Guadalupe Island, Mexico). Photograph by William L. Witt.



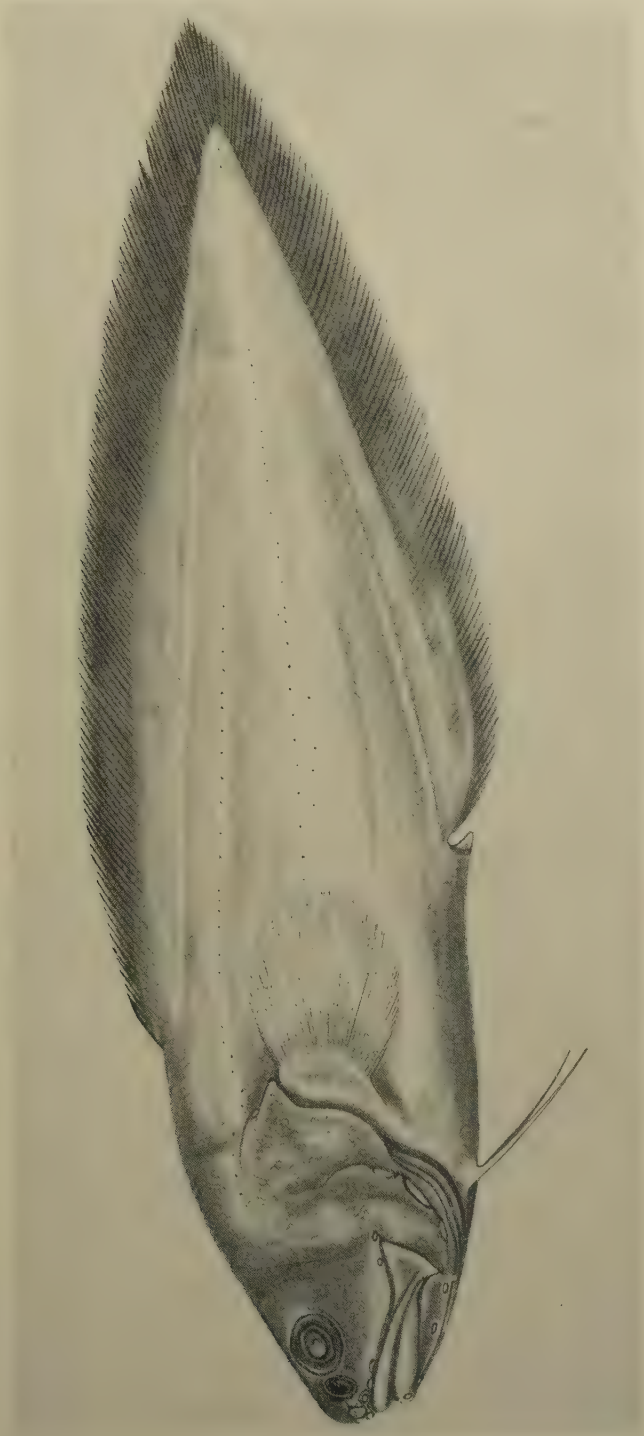
Oligopus ater (MCZ 26457. 89 mm. SL. Nice, France). Drawn by Mildred H. Carrington.



Oligopus longhursti (USNM 187778, holotype. 98 mm. SL. Lagos, Nigeria). Drawn by Mildred H. Carrington.



Oligopus waikiki (USNM 179892, holotype of *Microbrotula nigra*. 61.4 mm. SL. Hawaii). Drawn by Mildred H. Carrington.



Oligopus diagrammus (SU 7059, paratype. 54 mm. SL. Galapagos). Drawn by Mildred H. Carrington.

Oligopus diagrammus (Heller and Snodgrass)

PLATES 1, 5

Eutyx diagrammus Heller and Snodgrass, 1903, p. 224, pl. 19 (original description, Galapagos, Tagus Cove, Albemarle Island, and Seymour Islands).—Böhlke, 1957, p. 3 (paratype of *E. diagrammus* compared with *Stygnobrotula latebricola*).

STUDY MATERIAL.—Holotype, SU 6346 and paratype SU 7059 from the Galapagos. The following from Guadalupe Island, Baja California, Mexico: SIO 58-497 (1); SIO 58-493 (1); SIO 54-213A (1); SIO 54-219 (1); SIO H53-169 (1); SIO 54-219A (6); SIO 60-14-61E (2). Following from peninsular Baja California or closely adjacent islands: SIO 61-272-61B, Espiritu Santo Island (3); SIO 61-227-61A, Cape San Lucas (2); SIO 61-242-61A (4); and SIO 61-249 (1), Los Frailes.

COUNTS AND MEASUREMENTS.—Caudal 10; vertical scale rows between 100 and 115, very difficult to count. Vertebrae 49–53. (See table 2 for a summary of measurements, and table 3 for counts.)

DESCRIPTION.—Squamation: Patch of scales on top of head posterior to interorbital. Patch of scales present on opercle and in front of opercle extending anteriorly to a point less than eye diameter behind eye. Dorsal and lateral scale patches appearing continuous in some specimens and separated by scaleless area over lateral canal in others (small size of scales and adherent mucous coating on head make this a difficult character of which to be certain). Scale patch posterior to hind margin of maxillary appearing to be continuously connected with main opercular scale patch.

Lateralis system: Lateral canal with 1 pore near upper angle of opercle. Supraorbital canal with 1 pore in front of, and below, anterior nostril. Infraorbital canal with 5 pores: 1 behind anterior nostril; 2 along lip below posterior nostril; and 2 above posterior expanded portion of maxillary. Preoperculomandibular canal with 8 pores: 2 at tip of dentary, 1 opening anteriorly, the other posteriorly; 1 beneath lower lip close to level of posterior nostril (not shown in fig. 4); 1 at about midlength of jaw (could not be found in holotype); 1 slightly ahead of posterior margin of maxillary; 1 slightly behind same. Two elongate slits along posterior margin of preopercle.

Circumorbital, interorbital, and opercular areas and snout bearing scattered papillae. Small dark papillae distributed on head but thickly dispersed in particular on top of head and over adjoining predorsal area of top of body.

Lateral line marked by small papillae. One series of about 30 originating on head above opercle and, after slight irregular dip behind opercle, extending posteriorly in straight line between midline

and dorsal profile. Dorsal line terminating slightly more than half way back along body. Second line of about 37–45 small papillae originating in midline close to level of posterior tip of pectoral fin, not making pronounced dip at level of vent but extending straight back to tail with, at most, a slight irregularity near its origin.

Dentition: Dentaries with irregular row of sharply pointed teeth along inner margin of bone. Tooth-bearing area of bone broadens on anterior ½ to ⅔ of lower jaw. In specimens of less than about 100 mm., area exterior to large teeth occupied by granular teeth. In larger specimens these show gradual transition to second row of larger conical teeth that parallels inner row. Also 2 types of dentition on premaxillary. Specimens from 34 mm. to 81 mm. with uniform band of granular teeth, while those measuring 81 mm. and larger bearing row of large conical teeth along outer edge of band of granular teeth. Smaller specimens with only small granular teeth in broadly V-shaped patch on head of vomer. Larger specimens with larger conical teeth as well. Dentition in this species does not appear to be influenced by sex.

Sex: Two types of external sex organs, one consisting of stiff hood projecting posteriorly from vent and folding over genital area, the other consisting of only a low, fleshy ridge in place of prominent hood. In either type a delicate white papilla of varying length may be evident. Neither the two types of external genitalia nor the occurrence of the papilla appears to be correlated with sex as determined by gross observation of the gonads. In addition, at least one specimen (SIO 61–272–61B, Espiritu Santo) and possibly others appear hermaphroditic. What I have interpreted as testicular tissue produces spermatophore-like objects rather than free-running sperm suspensions. If my observations are correct, then sex in this species is a complex problem that requires detailed study.

Head spines: Blunt, flat spine deeply buried in flesh of opercle in most specimens, but exposed in paratype. Ventrally directed maxillary spine prominent in most specimens.

Vertebrae and ribs: Neural spines 5–14 short and broad but becoming progressively more elongate and narrower, their tips truncate; neural spines on subsequent centra needle-like. Centra 7–11 with ribs at ends of parapophyses (although in some, ribs appear to articulate with centrum no. 7); subsequent centra lacking pleural ribs. Centra 4–9 with epipleurals attached to pleural ribs; 10, 13, 14, or 15 with epipleurals associated with parapophyses or haemal spines.

Color: Brown in preservative. In life: "Dark brown, head purplish-brown; fins blackish" (Heller and Snodgrass,1903).

Distribution.—Previously known only from the Galapagos at

about 3 fathoms. Here recorded from Guadalupe Island and Baja California.

COMMENTS.—The data on dorsal and anal fin ray counts presented in table 3 indicate that the Galapagos-Guadalupe populations and the Baja California populations of *O. diagrammus* have differentiated. Under ordinary circumstances I would recognize them as named taxa; however, it seems likely that additional populations will be discovered in the tropical eastern Pacific, and this, combined with the puzzling nature of sexuality in this species, makes me hesitant to do more than point out the differences and the problems involved in interpreting them.

Oligopus claudei (Torre)

Benthocometes claudei Torre y Huerta, 1930, opposite p. 171, unnumbered plate (original description, Cuba, Matanzas Bay); 1931?, p. 231, fig. (brief discussion).

Bathystorreus claudei Howell Rivero, 1934, pp. 69–72, pl. 7 (new genus proposed, description).

Grammonus mowbrayi Grey, 1951, p. 154, fig. 1 (original description, type locality, Bermuda).—Collette, 1962, p. 443 (Bahamas).

STUDY MATERIAL.—The holotype of *B. claudei*, MCZ 33943 (in very poor condition). Three specimens ANSP Chaplin Bahama collections, St. 513; about ¼ mile N. of the center of Green Key, Bahamas; taken from inside a small, isolated coral head at a depth of 50 feet. One specimen, UP 1150; Puerto Rico, La Parquera, 6 miles offshore at vertical ledge, 65 feet. One specimen, UP 1151, Curaçao, cave at shore, about 100 meters SE. of entrance to bay.

COUNTS AND MEASUREMENTS.—See table 4.

DESCRIPTION.—Squamation: Scales present in patch over nape, on side of head over opercle and cheek, extending forward to a point less than eye diameter behind eye and ventrally to patch behind posterior margin of maxillary.

Lateralis system: Lateral canal with 4 pores in row: the most posterior above upper angle of opercle; the most anterior at junction of lateral canal and infraorbital canal. Supraorbital canal in Bahaman specimens with 4 pores extending in straight line from most anterior in front of anterior nostril to most posterior over rear half of eye; Puerto Rican specimen with only the 2 most anterior pores; and Curaçao specimen with the 3 most anterior pores on one side and the 2 most anterior pores on other side. Infraorbital canal with 8, 9, or 10 pores: 3 beneath nostrils; 1 smaller pore beneath eye about midway between orbit and lip; 2 or 3 pores in skin along maxillary sheath; and 2 or 3 pores in row extending up to lateral canal. Preoperculomandibular canal with 9–11 pores: 2 at tip of dentary, 1 opening anteriorly, the other posteriorly; 1 beneath lower lip at level of anterior margin of eye; row of 3

pores along medial edge of dentary, anteriormost about ⅓ of distance along pore, posterior beneath end of maxillary: 1 small pore sometimes present lateral to middle pore of this series; 1 pore above angular; 2 on posterior margin of preopercle, and sometimes another above, and in front of, dorsalmost preopercular pore. The pore system is well illustrated in the figure given with the original description of this species (Torre y Huerta, 1930). One difference is that the Bahaman material lacks the pore on the posterior surface of the angular, as shown on the holotype.

Lateral line system along body variable and complex, consisting basically of 2 rows of papillae: one with about 35 papillae originating over opercle and extending posteriorly almost to tail in line between midline of fish and dorsal profile; the other, with about 25 papillae, beginning slightly ahead of level of vent and, after an irregular beginning, proceeding posteriorly almost to tail in straight line between midline of fish and ventral profile of fish. In addition to these 2 basic lines (illustrated on the figure of the holotype), there are a profusion of other papillae whose distribution will not be described in detail. Suffice it to say that some are distributed virtually at random, some are in short series above or below the main lines, some are in short rows in the midline of the fish.

Papillae also scattered about on head, as are very small dermal filaments; however, no rugose areas on head.

Dentition and sex: In two specimens a band of granular teeth on premaxillary, another on dentary. Head of vomer carrying 2 large bony knobs, each with patch of granular teeth, each patch connected by narrow line of short teeth. Three other specimens with bands of granular teeth noted above and, in addition, with irregular single row of larger conical teeth located lateral to granular row on premaxillaries and medial to granular row on dentaries. A few of vomerine teeth also slightly enlarged. Specimens with granular teeth with only a small, fleshy flap over genital area. Other 3 with prominent, stiffened hoods; at least 1, UP 1151, with well-developed testes.

Head spines: Short, sharp spine piercing skin at upper angle of opercle. One specimen with several short spines at lower angle of opercle. Two short, sharp spines at lower angle of preopercle. Ventrally projecting premaxillary spine prominent, angular projecting downward as prominent blunt spine.

Vertebrae and ribs: Neural spines 5–13 or 14 short and broad but becoming progressively more elongate and narrower; their tips truncate. Neural spines on subsequent centra needle-like. Centrum 7 with free ribs, although rudiments of parapophysis visible on X-ray photograph of 1 specimen. Centra 8, 9, and 10–12 with ribs at ends of parapophyses, subsequent centra lacking pleural ribs. Centra

4–8 with epipleurals attached to pleural ribs; on centra 9–13 or 14, epipleurals associated with parapophyses or haemal spines.

Color: Body light brown; vertical fins dark, particularly on their vertical margins.

DISTRIBUTION.—Bermuda, the Bahamas, Puerto Rico, and Curaçao.

COMMENTS.—The holotype of *O. claudei* is in such poor condition that accurate measurements are impossible, and observations on the lateralis system are subject to question. It does seem certain, however, that, with the material at hand, there is no way of maintaining *Grammonus mowbrayi* Grey as a valid species.

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TABLE 1.—*Counts and measurements of* Oligopus longhursti

Counts	Holotype USNM 187778		Paratype USNM 187779		Paratype USNM 191732		Paratype USNM 191732		Paratype USNM 193678	
Dorsal	88		89		83		85		86	
Anal	58		61		58		61		59	
Pectoral	25		24		25		25		25	
Vertebrae	45		44		45		45		44	
Caudal	8		8		8		8		8	
Vertical scale rows (approximately)	120		–		120		120		120	
Measurements	**mm.**	**%SL**	**mm.**	**%SL**	**mm.**	**%SL**	**mm.**	**%SL**	**mm.**	**%SL**
Standard length	98.0	–	92.6	–	105	–	105	–	106	–
Body depth at dorsal origin	27.0	27.5	23.5	25.4	25.0	23.8	–	–	–	–
Predorsal	30.0	30.6	29.5	31.9	31.4	29.9	32.5	30.7	33.5	31.6
Preanal	50.5	51.5	48.5	52.4	55.1	52.5	58.0	54.7	60.4	56.9
Head length	25.6	26.1	24.3	26.2	26.2	24.9	26.9	25.4	28.5	26.7
Snout	5.9	6.0	5.7	6.2	6.2	5.9	5.2	4.5	6.2	5.8
Orbit	4.5	4.6	3.5	3.8	3.5	3.3	4.2	4.0	4.0	3.8
Upper jaw	15.0	15.3	14.0	15.1	14.8	14.1	14.5	13.7	15.5	14.6
Greatest width of maxillary	5.4	5.5	5.0	5.4	4.7	4.5	4.2	4.0	4.2	4.0
Greatest width of head	15.0	15.3	13.0	14.0	16.0	15.2	16.1	15.2	–	–

TABLE 2.—*Summary of measurements on* O. diagrammus *from three geographical localities (given as percent of standard length; average in parenthesis followed by range)*

Measurement	Galapagos-N=2 [1]		Guadalupe-N=13		Peninsular Baja Calif.-N=8	
Range in standard length (mm.)	91, 54		74.7–184		34.5–81.0	
Depth at dorsal origin	23.6	(21.4, 25.9)	24.5	[2] (21.3–32.1)	23.1	(20.9–25.2)
Predorsal	29.5	(28.6, 30.4)	29.1	(26.3–30.9)	29.4	(26.3–31.9)
Preanal	44.1	(43.9, 44.4)	47.3	(46.3–51.3)	46.3	(43.8–48.1)
Head length	26.6	(25.5, 27.8)	26.0	(25.1–27.2)	26.9	(25.3–27.8)
Snout	5.9	(5.4, 6.5)	5.2	(4.6–6.2)	5.7	(4.9–6.6)
Orbit	5.0	(4.4, 5.6)	4.3	(3.8–4.7)	4.8	(4.7–6.1)
Upper jaw	13.8	(14.7, 13.0)	13.2	(12.5–13.8)	13.7	(12.8–14.4)
Maxillary width	4.35	(4.3, 4.4)	4.4	(3.9–4.7)	4.5	[3] (4.0–5.0)
Head width	14.9	(13.4, 16.5)	14.2	(12.0–17.7)	13.3	(11.1–17.3)

[1] First number in parenthesis is holotype, second is paratype.
[2] N=12.
[3] N=5.

TABLE 3.—*Meristic data for* O. diagrammus *from three geographical localities*

Locality	Dorsal fin rays																				
	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
Galapagos	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–	–	–
Guadalupe	–	–	–	–	–	–	–	–	–	1	1	–	1	–	–	–	2	3	1	1	1
Baja California	2	–	–	–	3	–	1	–	1	1	–	–	–	–	–	–	–	–	–	–	–

	Anal fin rays															
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91
Galapagos	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–	–
Guadalupe	–	–	–	–	1	1	1	–	2	2	1	2	–	–	–	1
Baja California	1	4	–	2	–	–	–	–	–	–	–	–	–	–	–	–

	Pectoral fin rays					
	24	25	26	27	28	29
Galapagos	–	–	–	–	1	1
Guadalupe	–	–	6	4	1	–
Baja California	1	1	1	4	–	–

TABLE 4.—*Counts and measurements of* Oligopus claudei

Counts	Holotype MCZ 33943		3 specimens from Chaplin Bahama coll. sta. 513						Puerto Rico UP 1150		Curaçao UP 1151	
Dorsal fin rays	88		87		86		85		85		82	
Anal fin rays	[1] 62		66		67		69		68		64	
Pectoral fin rays	25		24		24		25		23		23	
Vertebrae	43		43		43		43		42		41	
Caudal fin rays	-		10		10		10		10		10	
Vertical scale rows (approx.)	75+		80		79		-		-		75	
Measurements	**mm.**	**%SL**	**mm.**	**%SL**	**mm.**	**%SL**	**mm.**	**%SL**	**mm.**	**%SL**	**mm.**	**%SL**
Standard length	90	(approx.)	79.1	-	80.6	-	80.6	-	45.0	-	58.4	-
Body depth at dorsal origin	-	-	-	-	22.2	27.5	23.0	28.5	12.0	26.7	15.6	26.7
Predorsal	-	-	29.1	36.8	28.7	35.6	27.4	34.0	14.5	32.2	19.5	33.4
Preanal	-	-	41.2	52.1	41.8	51.9	41.0	50.9	20.7	46.0	27.9	47.8
Head length	-	-	23.2	29.3	25.3	31.4	25.1	31.1	13.0	28.9	17.1	29.3
Snout	-	-	5.2	6.6	6.2	7.7	6.3	7.8	3.1	6.9	3.9	6.7
Orbit	-	-	3.6	4.6	4.0	5.0	3.8	4.7	2.7	6.0	2.6	4.4
Upper jaw	-	-	13.0	16.4	13.4	16.6	14.0	17.4	7.2	16.0	9.9	16.9
Greatest width at maxillary	-	-	5.0	6.3	5.2	6.4	5.4	6.7	3.0	6.7	4.0	6.9
Greatest width of head	-	-	15.0	19.0	15.1	18.7	15.4	19.1	7.6	16.9	8.7	14.9

[1] Possibly several more.

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NEW SPECIES OF POLYCHAETE WORMS OF THE GENUS EUPHROSYNE, WITH NOTES ON EUPHROSYNE BOREALIS ØRSTED

By Aaron L. Treadwell

In a recent paper (Treadwell, 1937, p. 25) I identified as *Euphrosyne borealis* Ørsted some annelids collected in Greenland by Capt. Robert A. Bartlett. Later comparison of these with other members of the genus led me to question the accuracy of this identification, and through the kindness of Dr. Waldo L. Schmitt I have had opportunity to examine all specimens of this genus in the collections of the United States National Museum. These were all labeled *Euphrosyne borealis*, but it appears that three species are represented.

Euphrosyne differs from the other members of the family Amphinomidae in that the neuropodia and notopodia are fused into a continuous ridge running from the ventrolateral border to the dorsal surface, leaving more or less of the middorsal region uncovered. The only species hitherto described from the northeastern coast of North America is *E. borealis* Ørsted (1842, p. 113). Ørsted's description is very brief, and the only addition to his account that I know is that of McIntosh (1885, pp. 5–6; pl. 1, figs. 2, 3; pl. 1A, figs. 4–6), who corrected Ørsted's statement that there are no dorsal cirri and gave some figures of the setae. To this account a few details may now be added.

Genus EUPHROSYNE Savigny

EUPHROSYNE BOREALIS Ørsted

FIGURE 46, *a*, *b*

Euphrosyna borealis ØRSTED, 1842, p. 113.

Body oval in outline; length 14 mm, width 7 mm. The parapodial ridge is thickly set with setae and gills, the tips of the dorsal setae in each somite overlapping those of the opposite side, their bases leaving a median dorsal clear space hardly wider than one-eighth of the body diameter. The caruncle (fig. 46, *a*) extends onto the fourth setigerous somite and has three longitudinal lobes, the median covering the laterals. At the anterior end of the caruncle lie the posterior eyes, overlapped by the basal portion of the median tentacle. This tentacle has a thickened, oval, basal portion that abruptly narrows distally into a slender process about one-third as long as the basal. An anterior pair of eyes lies on the ventral face of the prostomium and is not visible from above. In none of my material was I able to demonstrate the anterior paired tentacles that should lie at the level of the anterior eyes. In the other species these were easily seen. (See *E. branchiata* below.) The dorsal cirrus is sometimes difficult to see since it varies greatly in size. It is slender and, as noted by McIntosh (1885, p. 6), is fastened to the body wall almost in contact with the base of the dorsalmost gill (fig. 46, *b*). The ventral cirrus is much larger and lies near the ventral end of the seta row, its base surrounded by the ventralmost setae. In two somites taken at random there were six and seven gills in a single row on the parapodial ridge of one side of the body. Some of these were single filaments, but others may be 2-, 3-, or 4-branched (fig. 46, *b*). Ørsted described them as "bi-tripartitis." In the figure the dorsal cirrus is shown at the base of the gill.

The ventralmost setae form a prominent tuft in which those nearest the ventral surface are the shortest. Dorsal to the tuft the setae are shorter and continue of uniform width to the end of the ridge. The setae are as figured by McIntosh (1885, pl. 1A, figs. 4–6).

EUPHROSYNE BRANCHIATA, new species

FIGURE 46, *c–f*

Description.—Body length 6–7 mm; width 2–3 mm. The body is elongate-oval in outline and somewhat less shaggy in appearance than others of this genus. The ventral setae are longer than the dorsal and extend to a considerable distance from the body. Dorsal to this tuft of ventral setae the others are much shorter, hardly longer than the gills. The caruncle extends to the fourth somite, and the median

tentacle is about one-fourth as long as the caruncle. It is of uniform width throughout, lacking the slender terminal portion of *E. borealis* (fig. 46, *c*). The two pairs of eyes are situated as in *borealis*, and near the ventral pair are two slender tentacles. From a dorsal view only the tips of these tentacles are visible.

On the dorsal surface a clear space of about one-third the body width separates the upper ends of the parapodial ridges. At the ventral end of the ridge is a ventral cirrus with a tuft of long setae just dorsal to it. There follow rows of shorter setae with gills interspersed among them, and a dorsal cirrus is at the dorsal end of the row. In one row there were five gills, but I cannot say whether this

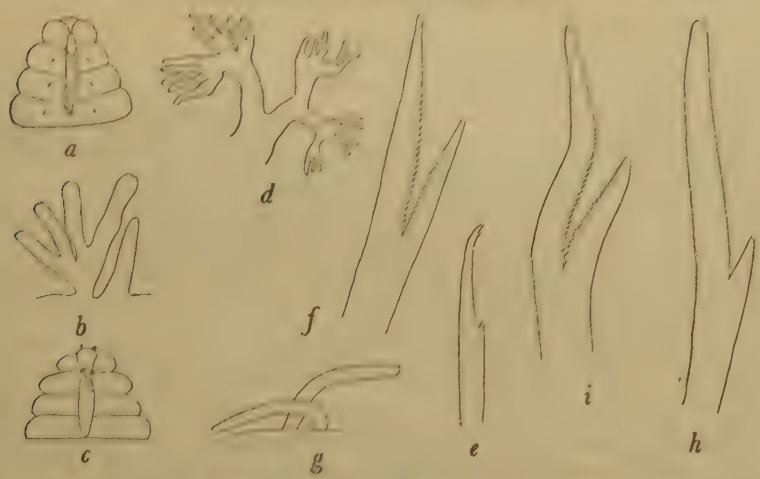

FIGURE 46.—Species of EUPHROSYNE

a, b, Euphrosyne borealis Ørsted: *a*, Anterior end, x 6; *b*, gill and dorsal cirrus, x 22.5.
c–f, Euphrosyne branchiata, new species: *c*, Anterior end, x 7.5; *d*, gill, x 68; *e*, small seta, x 250; *f*, large dorsal seta, x 250.
g–i, Euphrosyne longisetis, new species: *g*, Gill, x 22.5; *h*, smaller seta, x 185; *i*, larger seta, x 185.

number is constant in all somites. The gills (fig. 46, *d*) are complexly branched and about as long as the setae. The long setae of the ventral tuft very considerably in width and in the size of the larger tooth but are all alike in general structure. At some distance from the apex is a sharp tooth followed by a narrowing to the curved, sharp apex. Just behind the apex is a very small, slender tooth (fig. 46, *e*). In the row with the gills are shorter but heavier setae, which are hardly longer than the gills. They vary in size, but all have the general outline shown in figure 46, *f*. Some are smooth beyond the fork; others have the marginal lobing shown in the figure.

Type.—U.S.N.M. no. 20412. Collected by the U. S. S. *Albatross* at station 2265, October 18, 1884, at latitude 37°07′40″ N., longitude 74°35′40″ W., in 70 fathoms.

Remarks.—In the character of the gills and setae this species agrees closely with *E. armadillo* Sars as described by McIntosh (1900, pp. 238–240, pl. 35, figs. 2, 8–14), and possibly it may be that species. McIntosh described the median tentacle as biarticulate, by which I assume he meant like that figured for *E. borealis*, but in the present specimens the terminal slender portion is not present. Also, the subterminal fine tooth on the seta is larger than is shown in McIntosh's figure.

EUPHROSYNE LONGISETIS, new species

FIGURE 46, *g–i*

Description.—Caruncle and median tentacle much as in *E. borealis*, except that in the tentacle the basal portion is much shorter and the terminal narrow part relatively much longer than *borealis*. The setae are of more uniform width than in other species and extend to a greater distance from the body surface. It differs also from *E. borealis* in that the middorsal naked strip is much wider, being about as wide as one-third of the body width. In this respect it resembles *E. branchiata*. The gills are cirruslike processes of uniform diameter and generally unbranched (fig. 46, *g*), but in larger individuals a few may have two or three branches. On the parapodial ridge of one half somite there were six of these gills. Most of the setae are as shown in figure 46, *h*, having a conical subterminal tooth and the end of the seta blunt. In the dorsal part of the row the setae are as shown in figure 46, *i*, differing only slightly from those of *E. borealis*.

There is some difference in length between the ventral and the dorsal setae, this being more marked in large than in small individuals.

Type.—U.S.N.M. no. 338; labeled as collected in Greenland by Dr. Charles Lütkens. It is 15 mm long and 5 mm wide.

Remarks.—This species is the commonest of the genus in the National Museum collections. It is recorded as taken in Massachusetts Bay; off Head Harbor (probably U. S. Fish Commission station x, Aug. 2, 1872, Bay of Fundy, 2½ miles about southeast of Head Harbor Light, Campobello Island, 90 fathoms); Banquereau; and east end of Cobourg Island, Baffin Bay, latitude 75°40′ N., longitude 78°50′ W.

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